

NOTES AND EXTRACTS.

WORK OF THE WEATHER BUREAU.

The following items in relation to some features of the work of the United States Weather Bureau during the fiscal year ending June 30, 1904, are reprinted from the recently published report of the Secretary of Agriculture:

OBSERVATORY BUILDINGS.

Carrying out the policy of the Department, the Weather Bureau has continued to cooperate with the leading universities throughout the country, and at the present time the relations existing are more intimate and the work done more important than at any time in the history of the service. Several universities and colleges have donated ground for the erection of buildings. Appreciation of the value of the work being done by the Weather Bureau has also been demonstrated by several universities in placing at the disposal of the Bureau, without cost, office quarters in their buildings for recently established stations. The erection of buildings by the Weather Bureau saves the amount previously paid for rent of office quarters.

FORECASTS.

Weather forecasts for 36 and 48 hours in advance have been made daily throughout the year for each State and Territory, and special warnings of gales on the seacoasts, Gulf, and Great Lakes, and of cold waves, frost, heavy snows, floods, etc., have been issued when the advices would benefit commercial, agricultural, and business interests. The North Atlantic and West Indian storm-warning service was continued, and forecasts for the first three days out of steamers bound for European ports were issued daily at 8 a. m. and 8 p. m. In a number of instances European shipping interests were notified of the character and probable course of severe storms that were passing eastward from the American coast. Daily warnings and advices issued in connection with the injurious weather conditions of the year resulted in saving much property.

RIVER AND FLOOD SERVICE.

The floods of the year did not approach in character and importance the overflows of the spring of the year immediately preceding, when over 100 human lives were lost, besides property valued at over \$40,000,000. There were, nevertheless, severe floods at various times, and in the management of the work occasioned by them the river and flood service continued to demonstrate its usefulness and growing efficiency as a valuable branch of the Weather Bureau. That there has been constant progress in the accuracy of its work is evidenced by the more specific and detailed character of the forecasts and warnings in localities where such exact work had heretofore been considered practically impossible. The service performed during the prevalence of the great winter ice gorges in the Susquehanna, Allegheny, and Ohio rivers, with their attendant floods, was especially noteworthy. These gorges were the greatest in the history of the localities, and that their great dangers were minimized is due in no small degree to the timely advices and warnings of the Weather Bureau.

There were minor floods during nearly every month of the year, but each was amply covered by timely warnings. These floods were not in any sense alarming or dangerous, but they nevertheless attained sufficient importance to endanger a large amount of property.

CLIMATE AND CROP SERVICE.

The National weather and crop monthly and weekly bulletins and the annual summaries and monthly and weekly bulletins issued from the 43 section centers, also snow and ice bulletins, daily bulletins issued in connection with the corn, wheat, cotton, sugar, rice, and fruit services during the growing season, and the special snow bulletins issued during the winter by the sections in the Rocky Mountain and Plateau regions have appeared regularly during the year, and have been of great value in affording timely information.

DISTRIBUTION OF FORECASTS AND SPECIAL WARNINGS.

The extensive distribution of daily forecasts by means of forecast cards has continued, and the railway, telegraph, and train services have supplied in the aggregate over 5000 railroad stations with bulletins, generally posted in the waiting rooms, for the benefit of employees and the traveling public. The number of addresses on the rural free-delivery list has been greatly decreased as compared with that of the previous year, owing principally to the discontinuance of the afternoon forecast at some of the centers and the transfer of a large portion of this work to the free telephone service. The rural telephone lines are now the best and most economical means of distributing weather information. The forecasts are quickly disseminated, covering a large territory, with little or no expense to the Government. By arrangements made with two of the great trunk telephone lines of Ohio the daily morning forecasts are now available for the use of more than 100,000 subscribers in that State, and the records indicate that nearly one-half of that number have taken advantage of the opportunity to get the forecasts in their homes within a few minutes after their preparation at the district center.

MOUNT WEATHER METEOROLOGICAL RESEARCH OBSERVATORY.

During the past year the main building of the Mount Weather Observatory has been completed, while the power plant, the building from which balloon ascensions and kite flights are to be made, and the magnetic building are being constructed. The physical laboratory for electrical and radioactive effects is being planned, the erection of which will take place in another year. Finally, a comprehensive physical observatory for photographing the sun directly and through the spectrum, for measuring radiation energy by actinometry and bolometry, with their allied equipment, will be required. This complex institution must grow up slowly, as plans can be matured along the best modern lines. When the equipment is ready we shall make and send out apparatus for the exploring of the atmosphere to altitudes of from three to ten miles. It is probable that many balloons will be simultaneously liberated from different stations, so as to get records of storms and cold waves from their four quadrants. With observations from the magnetic, the electric, and the solar physics observatories, opportunity for study will be given to those who believe that the cyclonic and anticyclonic whirls that constitute storms and cold waves are mainly the result of changes in the amount of intensity of some form of solar radiation. It is the purpose to make the research at Mount Weather catholic in its broadness.

WIRELESS TELEGRAPHY.

The Department of Agriculture, through the Weather Bureau, was one of the first of the executive departments to take up, systematically, experimentation in problems concerned with the development of wireless telegraphy. By this action research into the physical problems concerned in transmitting messages through the medium of ether waves was greatly stimulated in this country. Probably one of the best, if not the best, instruments anywhere made for the receiving of wireless messages had its inception in the experimental work of the Weather Bureau. Recently a board was appointed by you to consider the whole problem of wireless telegraphy and the relation of the Government thereto. Its recommendations, which you approved, will result in the discontinuance of experiments along this line by the Weather Bureau, their transfer to the Navy Department, and the transfer to the Weather Bureau of all the meteorological work now being done by the Navy Department.

LONG-RANGE FORECASTS.

It is hoped the time will come when it will be possible to forecast the weather for coming seasons, to specify in what respect the coming month or season will conform to or depart from the weather that is common to the month or season; but that time has not yet arrived, and the officials of the Weather Bureau have been informed that they will best serve the public interests when they teach the communities they serve the true limitations of weather forecasting.

EDUCATION IN METEOROLOGY.

The Department is interested in the general introduction of meteorology into the courses of study provided by the universities and higher technical institutions of the country. The mode of teaching and the results obtained were made an important part of the work of the Convention of Weather Bureau Officials that was held at Peoria, Ill., in September, 1904. At an increasing number of educational institutions Weather Bureau officials, in addition to their regular duties and mainly outside of office hours, deliver courses of lectures on meteorology.

TELEGRAPH SERVICE.

To meet as far as possible the pressing demands for a wider distribution of the daily telegraphic reports of observations, arrangements were perfected during the year for a very generous increase in the number of such reports telegraphed over circuits and as special messages, and while, for economical reasons, it is impossible to satisfy all demands in this respect, it is believed that the present distribution of reports will result in a much more comprehensive display of weather conditions on the maps and bulletins, and will give general satisfaction both to the public and to our officials charged with making district and local forecasts. Submarine cables have been laid from Block Island, Rhode Island, to the mainland; from South Manitou to North Manitou Island, Michigan; from Flavel, Oreg., across the mouth of the Columbia River to Fort Canby, Wash.; and preparations are being made for laying one from North Nags Head to Manteo, Roanoke Island, North Carolina.

The reorganization, at the beginning of the year, of the vessel and wreck reporting service of the Weather Bureau, with additional stations at Sand Key, Florida, and Southeast Farallon, California, has largely added to the effectiveness of this popular feature of the Bureau, and is much appreciated by maritime interests generally. Vessel and wreck reports are now furnished free of charge, except for telegraph tolls over commercial lines, to all corporations and individuals who may apply for them. Besides reporting passing vessels, an important service is rendered by these stations in connection with maritime disasters.

INSTRUMENTAL EQUIPMENT.

The Bureau has now 158 stations completely equipped with instruments by means of which an automatic record is made of the direction and velocity of the wind, the duration of sunshine, the amount and time

of beginning and ending of rainfall, and the temperature and pressure of the air. With one or two exceptions, the stations that are not at present so equipped are of slight importance or, in general, have all the instruments necessary for the satisfactory performance of their work. One hundred and fifty-nine steel towers, with the improved auxiliary equipment for the display of storm warnings, are now installed at as many stations distributed over the shores of the Great Lakes and the Atlantic and Pacific seacoasts. At 77 of these stations high-power electric lanterns are used, and at the others improved oil lights.

AN HONEST LONG-RANGE FORECASTER.

In the MONTHLY WEATHER REVIEW for July, 1904, page 322, under the title "Fake Forecasts," we have expressed our remonstrance against the publication of long-range weather forecasts that pander to the desire of the managing editor of a newspaper for sensational headlines, irrespective of reliability or public welfare. No principles known to conservative, reliable meteorologists warrant the publication of long-range forecasts of the details of local weather. We were very sorry to include in our list of offenders the name of one who has published some good contributions to meteorology; one who has been a close student of the weather map, but who was unwittingly drawn into an attempt to make long-range predictions on a very slender basis and at a very great risk to the good name of science. "Science" is a term that can only be properly applied to facts, observations, principles, and conclusions that are recognized by the world of scholars as acceptable to all because well-founded and generally unchallenged. No one man's hypotheses, deductions, generalizations, discoveries, or theories form a part of the body of "science" until they have been fully published and have stood the test of public discussion. The scientific literature of the past two hundred years, and even of the past fifty years embraces hundreds and thousands of papers that have long since lost whatever importance they once had; in fact both societies and journals are on their guard against publishing that which is useless, to say nothing of being absurd and injurious. Science is conservative, not sensational. Those who publish their ideas first in newspapers, as though afraid to stand the racket of a quiz by their colleagues in the established societies or journals of science, are liable to deceive themselves, mislead the public, and finally come to grief themselves. But we are pleased to find that our friend had committed only the error of an enthusiastic but honest man, and we take great pleasure in publishing the following letter, in which he sets himself right before his fellow citizens and colleagues.—C. A.

NORTHFIELD, MASS., November 11, 1904.

EDITOR MONTHLY WEATHER REVIEW.

DEAR SIR: It has been brought to my attention that in a recent number of the MONTHLY WEATHER REVIEW I am classed among long-range forecasters who work "against all recognized principles of meteorology." As nothing could be further from the truth, and as I have done no work of a forecasting nature for many months, I should like to correct such a view, for I am diametrically opposed to all such humbuggery, and utterly fail to comprehend where such an opinion had its inception. The only long-range forecaster who ever made regular predictions, whose work seemed to me to have an iota of common sense in it, was your old servant Dunn, [Mr. E. B. Dunn of the Weather Bureau office in New York, not Mr. Lawrence Dunne of Alabama] and I have never looked into his work enough to overcome my prejudices against it on general principles. My own experiments abundantly satisfied me, first, that long-range work as a steady plan of procedure was inoperative, and, second, impracticable unless mixed with guesswork, i. e., lying. You are welcome to use enough of this letter to right the error as regards myself, and, it may be, reaffirm your position, provided that you correctly state my ideas. While I have been requested to give a statement of my position through the columns of widely circulated neutral mediums, I would much prefer to convince those with whom I have long labored through the official organ which has done me an injustice, though by means of some unknown source of misconception, I have no doubt.

Having corrected, as above, the false impressions that seem to have been created, I will, as briefly as consistent, give the results of my investigations of practical long-range forecasting, which will, I think, reiterate your own private and expressed convictions. I will first state that I wrote the Chief of Bureau in the year 1903 asking if there was no way

in which a practical weather worker who had recently passed the age limit, but who had previously passed the meteorological examination by a good number of points, could enter the service, as by reexamination. I received a curt if not a courteous negative. [The Chief of Bureau can not change the rulings of the Secretary of Agriculture or of the Civil Service Commission.] Having the wish to do something of benefit to the community in the field to which I was most particularly adapted, I started a weather forecast business and found, among other things:

First. That the public wants long-range forecasts regularly, and

Second. That it is impossible to make any such with sufficient correctness. I doubt if a Weather Bureau official who has ever made one short-range forecast privately thinks it impossible to make a single long-range forecast. Even the MONTHLY WEATHER REVIEW occasionally hints at the backward extension of great atmospheric changes, lasting perhaps a week—just as the giving away of a dam would slant the level of the water with increasing velocity, beginning at the dam.

Third. The editor of one daily paper carefully studied my three-day forecasts, admitted they were as correct as could be expected for two days, and then wanted them to cover more time as thoroughly. I should recommend that such newspapers try to have Congress appropriate half as much more if they want three-day forecasts, and, still more if they want a few hours' notice given of "tornadoes." People who think it doesn't take money to save money by weather predictions must be ignorant enough to support goose-bone and other theories, including astrology, moonshine, and bombs.

Fourth. The editor of a second daily paper studied my work most carefully and has been writing me ever since to recommence it.

Fifth. Various other editors either wanted me to furnish such stuff very cheaply or else to make exciting predictions, or with impossible regularity, which would necessitate lying. I would not do anything of the kind, and naturally object strenuously to being classed among those who sacrifice honor for profit.

Sixth. The people generally throughout the region covered by the last "cold winter" expect another colder than the average. Here is a whole people making a long-range prediction. Can all the people fool themselves some of the time? Or could a specialist not make such a prediction?

Seventh. As the result of my work, leading reputable papers, etc., began having their own "three-day predictions." Where these have been justified they have been continued. If I proved my three-day predictions were as good or better than 83 per cent correct, why should the Civil Service rules absolutely exclude a man of thirty-five years from his country's service in his chosen and peculiar profession?

Eighth. That the Weather Bureau gets the credit for all such paid for work, where the furnisher does not get part pay in advertising. Thus, if the incog. work is good the Bureau is helped, and if bad, to use the A B C argument, the people relish it or they wouldn't support the paper in using it. When it is not incog., if it is good, it is a reflection on the Bureau for not having such men in its employ, and if bad it should carry its own condemnation. However, in my case, I furnished my own name for the editors to do as they saw fit with, and that leads me to remark:

Ninth. As the Weather Bureau is like the Government "of, for and by the people," can there be harm in discreet persons using it not only privately but publicly if honorably giving it due credit in their work? Wherever I have been the Weather Bureau officials have been helped, (and so the general service,) more than I, by the value of my work. Sensational predictions are almost never justified, though the Minnesota type of a West Indian tornado should have been heralded several hours in advance, if that would not have resulted in more deaths from fright than it would have prevented.

Tenth. An editor in Duluth, Minn., said that all weather predictions were injurious to his paper; if you predict fair the advertisers would have advertised any way, and if you predict rain they wouldn't advertise at all. That argument is about as old as the age of man.

Eleventh. I obtained the most peculiar assortment of ideas from editors from Chicago to St. Louis and Winnipeg, including all sorts of forecasting "from stocks to eternity." Confining myself strictly to weather, it seems that the people "as a whole" have got to be educated "up" to "long-range forecasts" before they can be satisfied with what few they can "gamble on," and the various newspapers who used these generally "kicked" if they couldn't dig out at least a terrible hailstorm or blizzard every time.

Twelfth. I established the great principle that the appearance of a cool wave within the field of observation is the surest sign of all weather changes in that field that short-range predictions can foretell. If I made that fact emphatically understood by those sufficiently conversant the result of my labor is a success.

So as I reluctantly abandoned trying daily long-range newspaper forecasts for that part of North America, preferring honor to money, I would deeply appreciate the favor if you can conveniently set me right again with your readers.

Sincerely,

ALTON D. ELMER.

METEOROLOGICAL COURSE AT WILLIAMS COLLEGE.

In response to an inquiry by the Editor we learn that Prof. Willis I. Milham, Director of the Field Memorial Observatory